

AMENDMENTS TO THE CLAIMS

Claims 1-32 (Canceled).

Claim 33 (Currently amended): A molecular memory, said memory comprising an electrochemical cell array, said cell array comprising a plurality of nanoscale electrochemical cells wherein a cell comprising said memory is a well having a cross-sectional area less than about ~~typically less than~~ 1 micron by 1 micron;
wherein a wall of said well comprises a first electrode and a second electrode said first electrode and said second electrode separated by a non-conductor or semi-conductor, wherein the ratio of the surface area of said first electrode exposed to the interior of said well to the surface area of said second electrode exposed to the interior of said well is at least about 2:1; and wherein a redox-active molecule is electrically coupled to said second electrode.

Claim 34 (Original): The memory of claim 33, wherein said redox-active molecule is a molecule selected from the group consisting of a porphyrinic macrocycle, a metallocene, a linear polyene, a cyclic polyene, a heteroatom-substituted linear polyene, a heteroatom-substituted cyclic polyene, a tetrathiafulvalene, a tetraselenafulvalene, a metal coordination complex, a buckyball, a triarylamine, a 1,4-phenylenediamine, a xanthene, a flavin, a phenazine, a phenothiazine, an acridine, a quinoline, a 2,2'-bipyridyl, a 4,4'-bipyridyl, a tetrathiotetracene, and a peri-bridged naphthalene dichalcogenide.

Claim 35 (Original): The memory of claim 34, wherein said redox-active molecule is a molecule selected from the group consisting of a porphyrin, an expanded porphyrin, a contracted porphyrin, a ferrocene, a linear porphyrin polymer, a porphyrin sandwich complex, and a porphyrin array.

Claim 36 (Original): The memory of claim 35, wherein said organic molecule comprises a porphyrinic macrocycle substituted at a β - position or at a *meso*- position.

Claim 37 (Original): The memory of claim 33, wherein said ratio is predetermined.

Claim 38 (Original): The memory of claim 33, wherein said ratio is at least about 5:1.

Claim 39(Original): The memory of claim 33, wherein said well has a volume less than about 10 femtoliters (10×10^{-15} L).

Claim 40 (Original): The memory of claim 33, wherein said array comprises at least 100 wells.

Claim 41 (Original): The memory of claim 33, wherein the center to center distance between two wells comprising said memory is about 250 nm or less.

Claim 42 (Original): The memory of claim 33, wherein a plurality of the cells comprising said memory are independently addressable.

Claim 43 (Original): The memory of claim 33, wherein said first electrode comprises all the walls comprising said well except the bottom wall and, if present, a top wall.

Claim 44 (Original): The memory of claim 33, wherein said first electrode and said second electrode comprises all the walls comprising said well except the bottom wall and, if present, a top wall.

Claim 45 (Original): The memory of claim 33, wherein said first and said second electrode are independently selected from the group consisting of copper, silver, gold, platinum, a conducting polymer, aluminum, silicon, germanium, gallium arsenide, ruthenium, titanium and tantalum.

Claim 46 (Original): The memory of claim 33, wherein said first electrode is a semiconductor.

Claim 47 (Original): The memory of claim 33, wherein said insulator or semiconductor is an insulator.

Claim 48 (Currently Amended): The ~~electrochemical cell array~~ memory of claim 47, wherein said insulator is selected from the group consisting of silicon dioxide, silicon nitride.

Claim 49 (Currently amended): The ~~electrochemical cell array~~ memory of claim 33, wherein said first electrode is a silver electrode, said second electrode is a gold electrode.

Claim 50 (Currently amended): The ~~electrochemical cell array~~ memory of claim 49, wherein said array is formed on a silicon substrate.

Claim 51 (Currently amended): The ~~electrochemical cell array~~ memory of claim 49, wherein a plurality of the cells of said memory are independently ~~addressable~~ addressed.

Claims 52 -117 (Canceled).